

## VALOX™ FR RESINS 310SEO

REGION EUROPE

### DESCRIPTION

VALOX 310SEO is an unreinforced, flame retardant Polybutylene Terephthalate (PBT) injection moldable grade with excellent chemical resistance. It has a UL94V0@0.71mm and 5VA@3.0mm flame rating. This is a good candidate for thin wall applications in the electrical industry including bobbins, keyboards, switches and appliance housings.

### TYPICAL PROPERTY VALUES

Revision 20260509

| PROPERTIES                                   | TYPICAL VALUES | UNITS     | TEST METHODS |
|----------------------------------------------|----------------|-----------|--------------|
| <b>MECHANICAL</b>                            |                |           |              |
| Tensile Stress, yld, Type I, 50 mm/min       | 58             | MPa       | ASTM D638    |
| Tensile Stress, brk, Type I, 50 mm/min       | 52             | MPa       | ASTM D638    |
| Tensile Strain, yld, Type I, 50 mm/min       | 5              | %         | ASTM D638    |
| Tensile Strain, brk, Type I, 50 mm/min       | 18             | %         | ASTM D638    |
| Tensile Modulus, 5 mm/min                    | 2820           | MPa       | ASTM D638    |
| Flexural Stress, yld, 1.3 mm/min, 50 mm span | 101            | MPa       | ASTM D790    |
| Flexural Modulus, 1.3 mm/min, 50 mm span     | 2620           | MPa       | ASTM D790    |
| Taber Abrasion, CS-17, 1 kg                  | 19             | mg/1000cy | SABIC method |
| Tensile Stress, yield, 50 mm/min             | 58             | MPa       | ISO 527      |
| Tensile Stress, break, 50 mm/min             | 40             | MPa       | ISO 527      |
| Tensile Strain, yield, 50 mm/min             | 5              | %         | ISO 527      |
| Tensile Strain, break, 50 mm/min             | 18             | %         | ISO 527      |
| Tensile Modulus, 1 mm/min                    | 2800           | MPa       | ISO 527      |
| Flexural Stress, yield, 2 mm/min             | 90             | MPa       | ISO 178      |
| Flexural Modulus, 2 mm/min                   | 2600           | MPa       | ISO 178      |
| Ball Indentation Hardness, H358/30           | 105            | MPa       | ISO 2039-1   |
| Hardness, Rockwell R                         | 120            | -         | ISO 2039-2   |
| <b>IMPACT</b>                                |                |           |              |
| Charpy Impact, unnotched, 23°C               | NB             | kJ/m²     | ISO 179/2C   |
| Charpy Impact, unnotched, -30°C              | NB             | kJ/m²     | ISO 179/2C   |
| Izod Impact, unnotched, 23°C                 | NB             | J/m       | ASTM D4812   |
| Izod Impact, unnotched, -30°C                | NB             | J/m       | ASTM D4812   |
| Izod Impact, notched, 23°C                   | 40             | J/m       | ASTM D256    |
| Izod Impact, notched, 0°C                    | 45             | J/m       | ASTM D256    |
| Izod Impact, notched, -30°C                  | 25             | J/m       | ASTM D256    |
| Instrumented Dart Impact Total Energy, 23°C  | 200            | J         | ASTM D3763   |
| Izod Impact, unnotched 80°10'4 +23°C         | NB             | kJ/m²     | ISO 180/1U   |
| Izod Impact, unnotched 80°10'4 -30°C         | NB             | kJ/m²     | ISO 180/1U   |
| Izod Impact, notched 80°10'4 +23°C           | 5              | kJ/m²     | ISO 180/1A   |
| Izod Impact, notched 80°10'4 0°C             | 5              | kJ/m²     | ISO 180/1A   |
| Izod Impact, notched 80°10'4 -30°C           | 4              | kJ/m²     | ISO 180/1A   |
| Charpy 23°C, V-notch Edgew 80°10'4 sp=62mm   | 8              | kJ/m²     | ISO 179/1eA  |
| Charpy Impact, notched, 23°C                 | 5              | kJ/m²     | ISO 179/2C   |
| Charpy -30°C, V-notch Edgew 80°10'4 sp=62mm  | 4              | kJ/m²     | ISO 179/1eA  |

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| PROPERTIES                                  | TYPICAL VALUES | UNITS    | TEST METHODS   |
|---------------------------------------------|----------------|----------|----------------|
| Charpy Impact, notched, -30°C               | 5              | kJ/m²    | ISO 179/2C     |
| Charpy 23°C, Unnotch Edgew 80*10*4 sp=62mm  | NB             | kJ/m²    | ISO 179/1eU    |
| Charpy -30°C, Unnotch Edgew 80*10*4 sp=62mm | NB             | kJ/m²    | ISO 179/1eU    |
| <b>THERMAL</b>                              |                |          |                |
| Vicat Softening Temp, Rate A/50             | 212            | °C       | ASTM D1525     |
| Vicat Softening Temp, Rate B/50             | 170            | °C       | ASTM D1525     |
| HDT, 0.45 MPa, 3.2 mm, unannealed           | 160            | °C       | ASTM D648      |
| HDT, 1.82 MPa, 3.2mm, unannealed            | 74             | °C       | ASTM D648      |
| HDT, 0.45 MPa, 6.4 mm, unannealed           | 162            | °C       | ASTM D648      |
| HDT, 1.82 MPa, 6.4 mm, unannealed           | 71             | °C       | ASTM D648      |
| <b>CTE</b>                                  |                |          |                |
| -40°C to 40°C, flow                         | 7.92E-05       | 1/°C     | ASTM E831      |
| -40°C to 40°C, xflow                        | 7.92E-05       | 1/°C     | ASTM E831      |
| 60°C to 138°C, flow                         | 1.31E-04       | 1/°C     | ASTM E831      |
| -40°C to 40°C, flow                         | 7.6E-05        | 1/°C     | ISO 11359-2    |
| -40°C to 40°C, xflow                        | 7.3E-05        | 1/°C     | ISO 11359-2    |
| 23°C to 60°C, flow                          | 1.E-04         | 1/°C     | ISO 11359-2    |
| 23°C to 60°C, xflow                         | 1.E-04         | 1/°C     | ISO 11357-6    |
| Thermal Conductivity                        | 0.24           | W/m-°C   | ISO 8302       |
| <b>Ball Pressure Test</b>                   |                |          |                |
| 125°C +/- 2°C                               | PASSES         | -        | IEC 60695-10-2 |
| Vicat Softening Temp, Rate A/50             | 212            | °C       | ISO 306        |
| Vicat Softening Temp, Rate B/50             | 170            | °C       | ISO 306        |
| Vicat Softening Temp, Rate B/120            | 170            | °C       | ISO 306        |
| HDT/Be, 0.45MPa Edgew 120*10*4 sp=100mm     | 150            | °C       | ISO 75/Be      |
| HDT/Ae, 1.8 MPa Edgew 120*10*4 sp=100mm     | 60             | °C       | ISO 75/Ae      |
| HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm       | 73             | °C       | ISO 75/Af      |
| Relative Temp Index, Elec                   | 120            | °C       | UL 746B        |
| Relative Temp Index, Mech w/impact          | 120            | °C       | UL 746B        |
| Relative Temp Index, Mech w/o impact        | 140            | °C       | UL 746B        |
| <b>PHYSICAL</b>                             |                |          |                |
| Specific Gravity                            | 1.4            | -        | ASTM D792      |
| Specific Volume                             | 0.71           | cm³/g    | ASTM D792      |
| Mold Shrinkage on Tensile Bar, flow         | 1.1 – 1.8      | %        | SABIC method   |
| Mold Shrinkage, flow, 3.2 mm                | 1.5 – 2.3      | %        | SABIC method   |
| Mold Shrinkage, flow, 0.75-2.3 mm           | 0.9 – 1.6      | %        | SABIC method   |
| Mold Shrinkage, flow, 2.3-4.6 mm            | 1.5 – 2.3      | %        | SABIC method   |
| Mold Shrinkage on Tensile Bar, xflow        | 0.9 – 1.9      | %        | SABIC method   |
| Mold Shrinkage, xflow, 0.75-2.3 mm          | 1 – 1.7        | %        | SABIC method   |
| Mold Shrinkage, xflow, 2.3-4.6 mm           | 1.6 – 2.4      | %        | SABIC method   |
| Melt Flow Rate, 250°C/2.16 kgf              | 8.6            | g/10 min | ASTM D1238     |
| Melt Flow Rate, 265°C/5.0 kgf               | 33             | g/10 min | ASTM D1238     |
| Melt Flow Rate, 266°C/5.0 kgf               | 33             | g/10 min | ASTM D1238     |
| Density                                     | 1.4            | g/cm³    | ISO 1183       |
| Water Absorption, (23°C/saturated)          | 0.36           | %        | ISO 62-1       |
| Moisture Absorption (23°C / 50% RH)         | 0.08           | %        | ISO 62         |

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| PROPERTIES                                    | TYPICAL VALUES                | UNITS      | TEST METHODS   |
|-----------------------------------------------|-------------------------------|------------|----------------|
| Melt Volume Rate, MVR at 250°C/2.16 kg        | 8                             | cm³/10 min | ISO 1133       |
| Melt Volume Rate, MVR at 250°C/5.0 kg         | 15                            | cm³/10 min | ISO 1133       |
| Melt Volume Rate, MVR at 265°C/5.0 kg         | 30                            | cm³/10 min | ISO 1133       |
| Melt Viscosity, 260°C, 1500 sec-1             | 260                           | Pa.s       | ISO 11443      |
| <b>ELECTRICAL</b>                             |                               |            |                |
| Volume Resistivity                            | >1.E+15                       | Ω.cm       | ASTM D257      |
| Dielectric Strength, in air, 3.2 mm           | 18,4                          | kV/mm      | ASTM D149      |
| Dielectric Strength, in oil, 1.6 mm           | 24                            | kV/mm      | ASTM D149      |
| Dielectric Strength, in oil, 3.2 mm           | 18                            | kV/mm      | ASTM D149      |
| Arc Resistance, Tungsten {PLC}                | 6                             | PLC Code   | ASTM D495      |
| Hot Wire Ignition {PLC}                       | 2                             | PLC Code   | UL 746A        |
| High Voltage Arc Track Rate {PLC}             | 4                             | PLC Code   | UL 746A        |
| High Voltage Arc Resistance {PLC}             | 6                             | PLC Code   | UL 746A        |
| High Ampere Arc Ign, surface {PLC}            | 0                             | PLC Code   | UL 746A        |
| Comparative Tracking Index {UL} {PLC}         | 3                             | PLC Code   | UL 746A        |
| Volume Resistivity                            | >1.E+15                       | Ω.cm       | IEC 60093      |
| Surface Resistivity, ROA                      | >1.E+15                       | Ω          | IEC 60093      |
| Dielectric Strength, shorttime, 1.0mm         | 18                            | kV/mm      | IEC 60243-1    |
| Dielectric Strength, in oil, 0.8 mm           | 35                            | kV/mm      | IEC 60243-1    |
| Dielectric Strength, in oil, 1.6 mm           | 25                            | kV/mm      | IEC 60243-1    |
| Dielectric Strength, in oil, 3.2 mm           | 17                            | kV/mm      | IEC 60243-1    |
| Relative Permittivity, 1 MHz                  | 2.9                           | -          | IEC 60250      |
| Relative Permittivity, 100 Hz                 | 3.1                           | -          | IEC 60250      |
| Relative Permittivity, 50/60 Hz               | 2.9                           | -          | IEC 60250      |
| Dissipation Factor, 1 MHz                     | 0.013                         | -          | IEC 60250      |
| Dissipation Factor, 100 Hz                    | 0.002                         | -          | IEC 60250      |
| Dissipation Factor, 50/60 Hz                  | 0.001                         | -          | IEC 60250      |
| Comparative Tracking Index                    | 175                           | V          | IEC 60112      |
| Comparative Tracking Index, M                 | 100                           | V          | IEC 60112      |
| <b>FLAME CHARACTERISTICS</b>                  |                               |            |                |
| UL Yellow Card Link                           | <a href="#">E45329-236586</a> | -          | -              |
| UL Recognized, 94V-0 Flame Class Rating       | 0.71                          | mm         | UL 94          |
| UL Recognized, 94-5VA Flame Class Rating      | 3                             | mm         | UL 94          |
| Glow Wire Flammability Index 960°C, passes at | 1                             | mm         | IEC 60695-2-12 |
| Oxygen Index (LOI)                            | 30                            | %          | ISO 4589       |
| <b>INJECTION MOLDING</b>                      |                               |            |                |
| Drying Temperature                            | 120                           | °C         |                |
| Drying Time                                   | 3 – 4                         | Hrs        |                |
| Drying Time (Cumulative)                      | 12                            | Hrs        |                |
| Maximum Moisture Content                      | 0.02                          | %          |                |
| Melt Temperature                              | 245 – 260                     | °C         |                |
| Nozzle Temperature                            | 240 – 255                     | °C         |                |
| Front - Zone 3 Temperature                    | 245 – 260                     | °C         |                |
| Middle - Zone 2 Temperature                   | 240 – 255                     | °C         |                |
| Rear - Zone 1 Temperature                     | 230 – 250                     | °C         |                |

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| Mold Temperature      | 50 – 75        | °C    |              |
| Back Pressure         | 0.3 – 0.7      | MPa   |              |
| Screw Speed           | 50 – 100       | rpm   |              |
| Shot to Cylinder Size | 40 – 80        | %     |              |
| Vent Depth            | 0.013 – 0.025  | mm    |              |

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